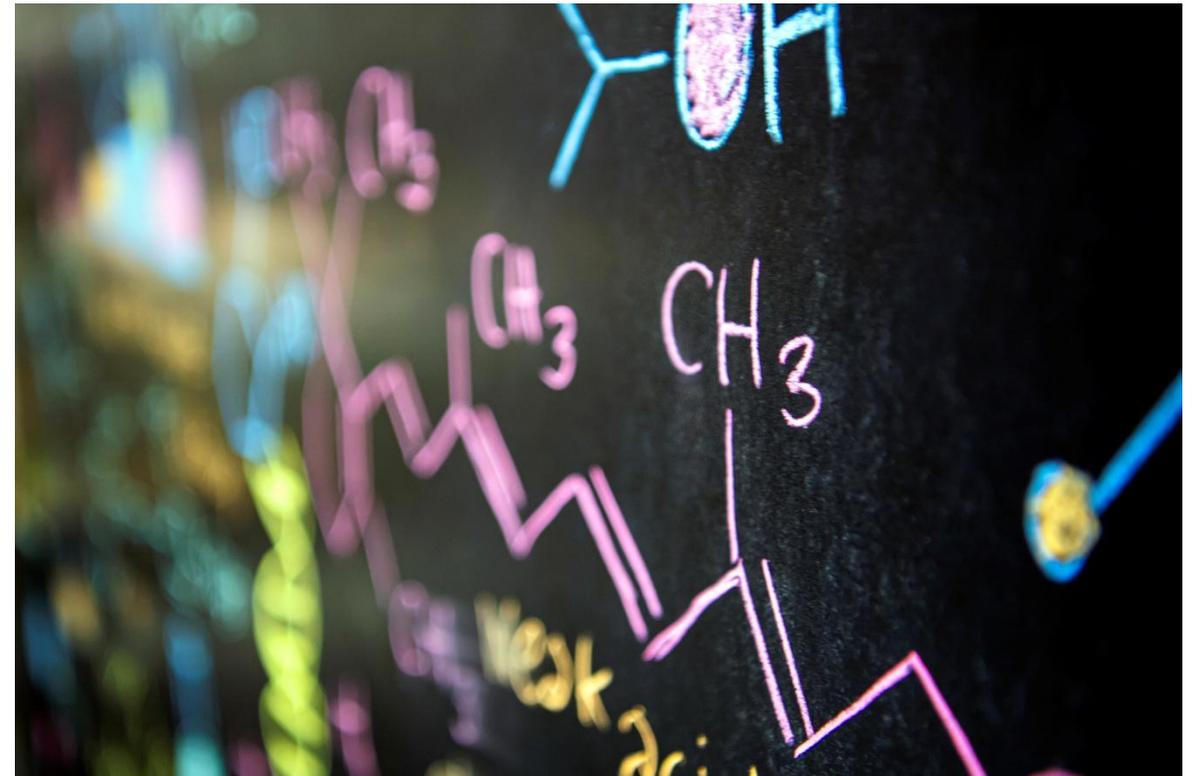


Joint Webinar by  
FESI, WFSGI and EOG

Legal Obligations and Business  
Impacts of the New PFAS Test Method  
(EN 17681-1:2025)

Tuesday, 3 February 2026

Speaker: Dr. David Biskup



# Agenda



PFAS – a brief introduction



Test methods (Total Fluorine, Targeted Analysis & Analytical Drawbacks)



One test method for all legislations?



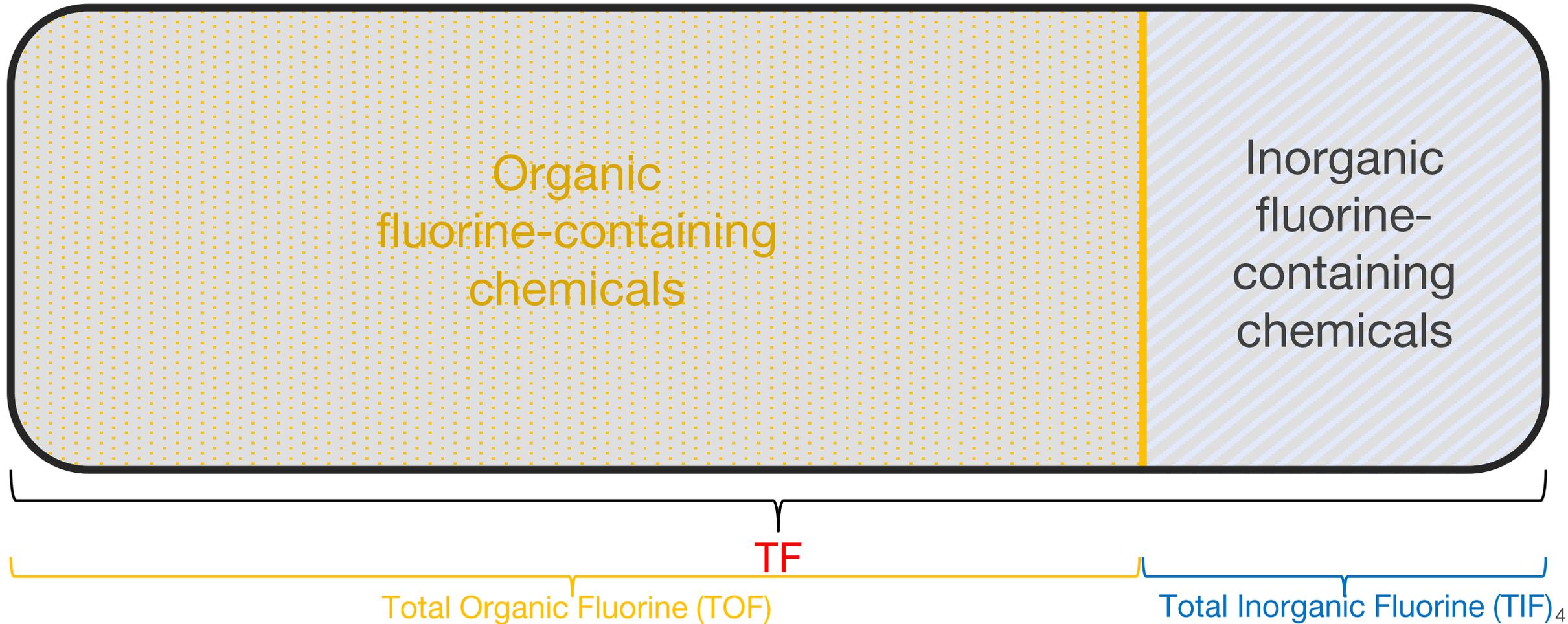
Potential sources of contamination

# Per- und polyfluoroalkyl substances (PFAS)

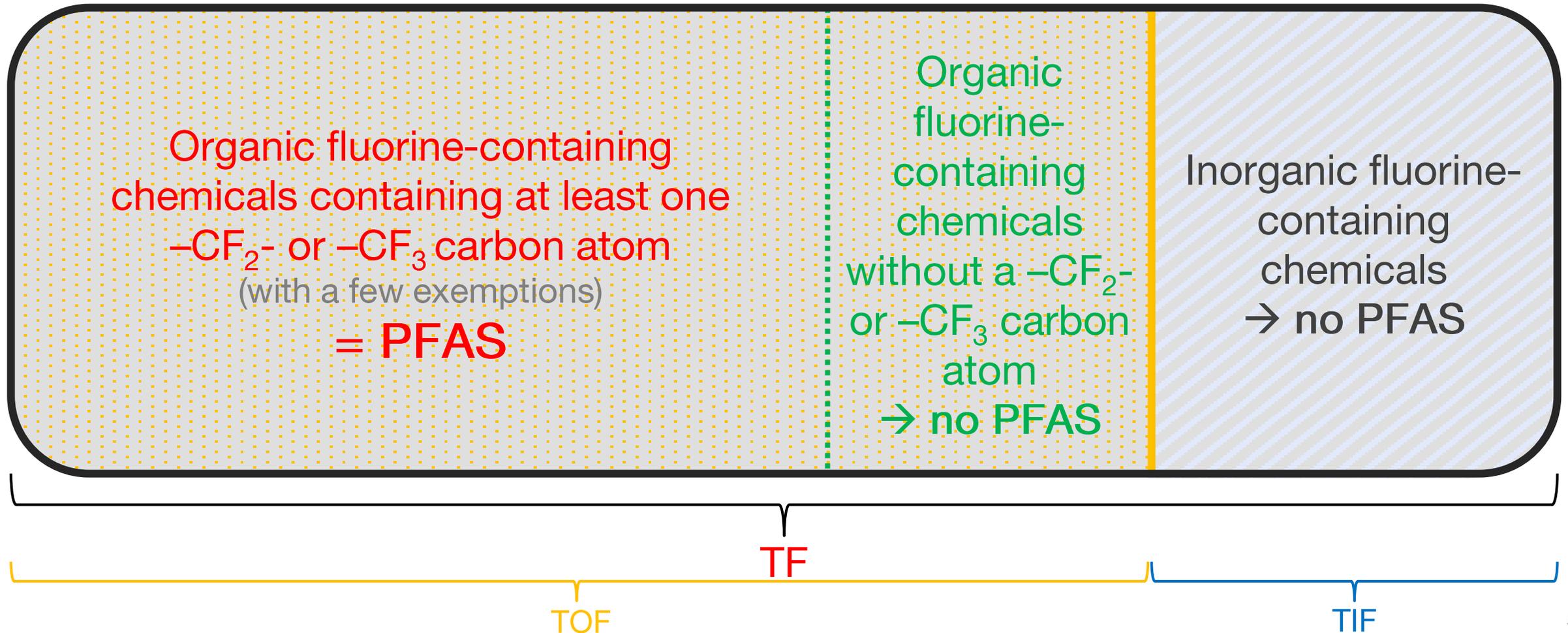
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- The term PFC (per- and polyfluorinated chemicals) is often used synonymously.
- OECD definition: Any substance containing at least
  - one fully fluorinated methyl carbon atom ( $\text{CF}_3-$ ) or
  - one fully fluorinated methylene carbon atom ( $-\text{CF}_2-$ ),
  - without any H, Cl, Br or I atom attached to it.
- There are approximately 15,000 different PFAS
- Synthetic, man-made chemicals
- The carbon-fluorine bond is very strong:
  - chemically inert
  - no or very slow degradation in the environment (“forever chemicals”)
- water- and oil-repellent

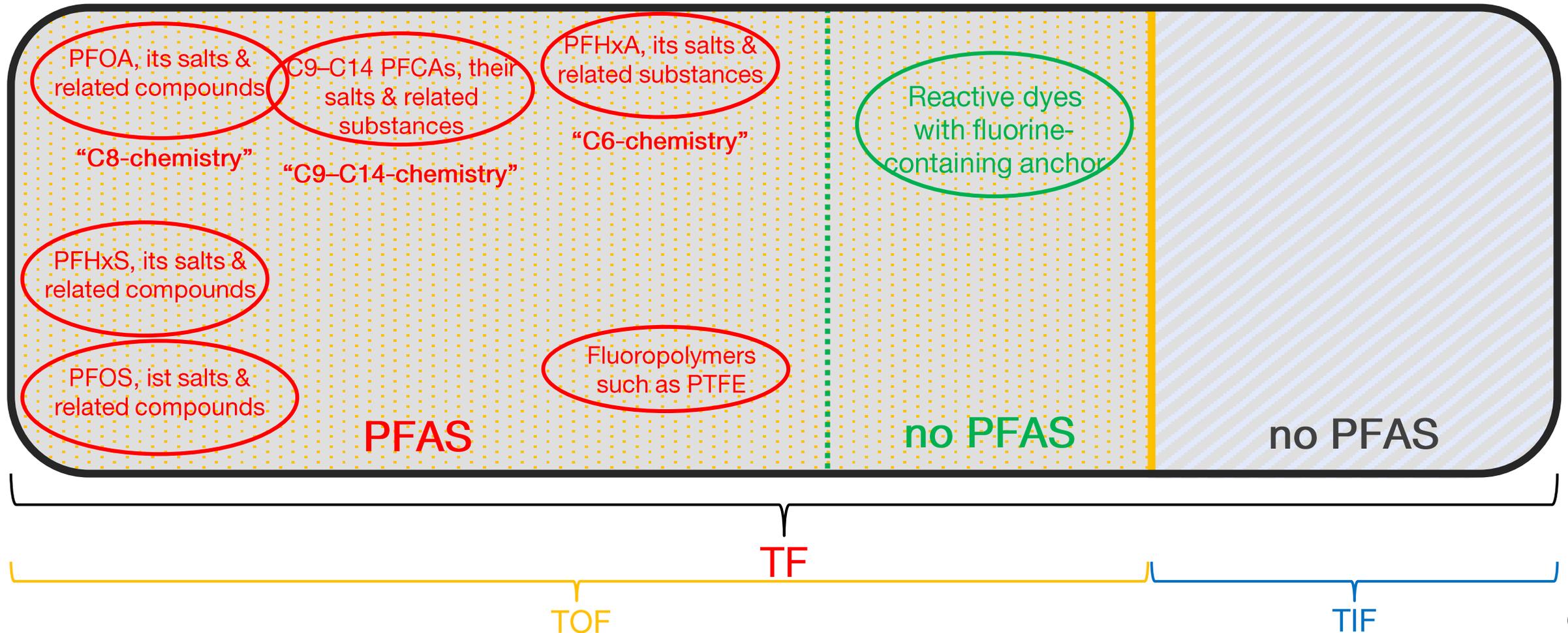
# PFAS vs. fluorine-containing chemicals



# PFAS: a subgroup of fluorine-containing chemicals



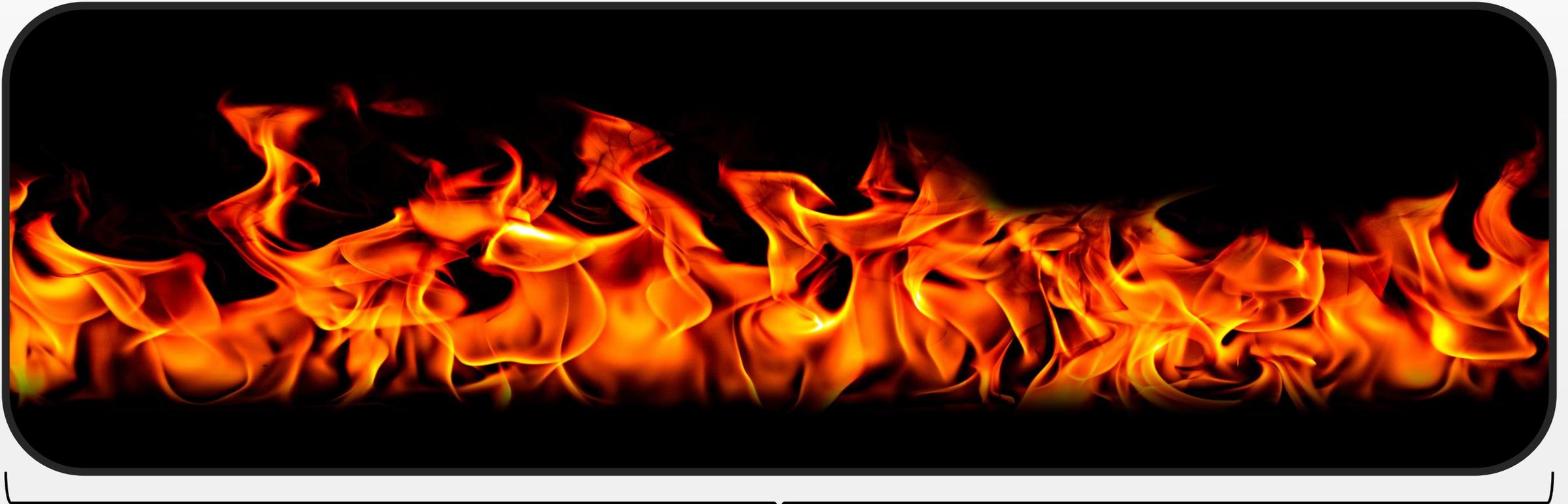
# PFAS: a subgroup of fluorine-containing chemicals



Total Fluorine  
prEN ISO 20999:2025 or EN 14582:2016

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GermanFashion  
Modeverband Deutschland e.V.



TF

# Total Fluorine

prEN ISO 20999:2025 or EN 14582:2016

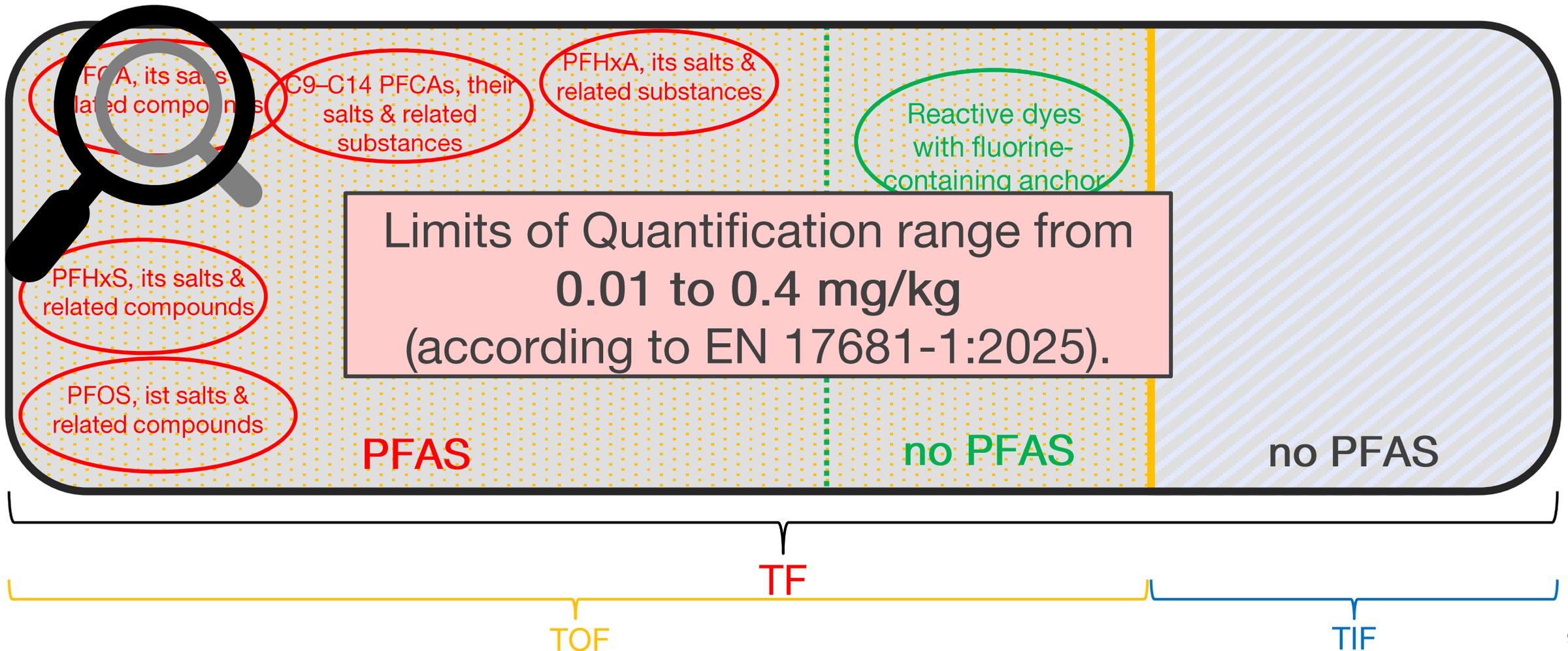
Limit of Quantification (LoQ) range  
from ~5 to 20 mg/kg.



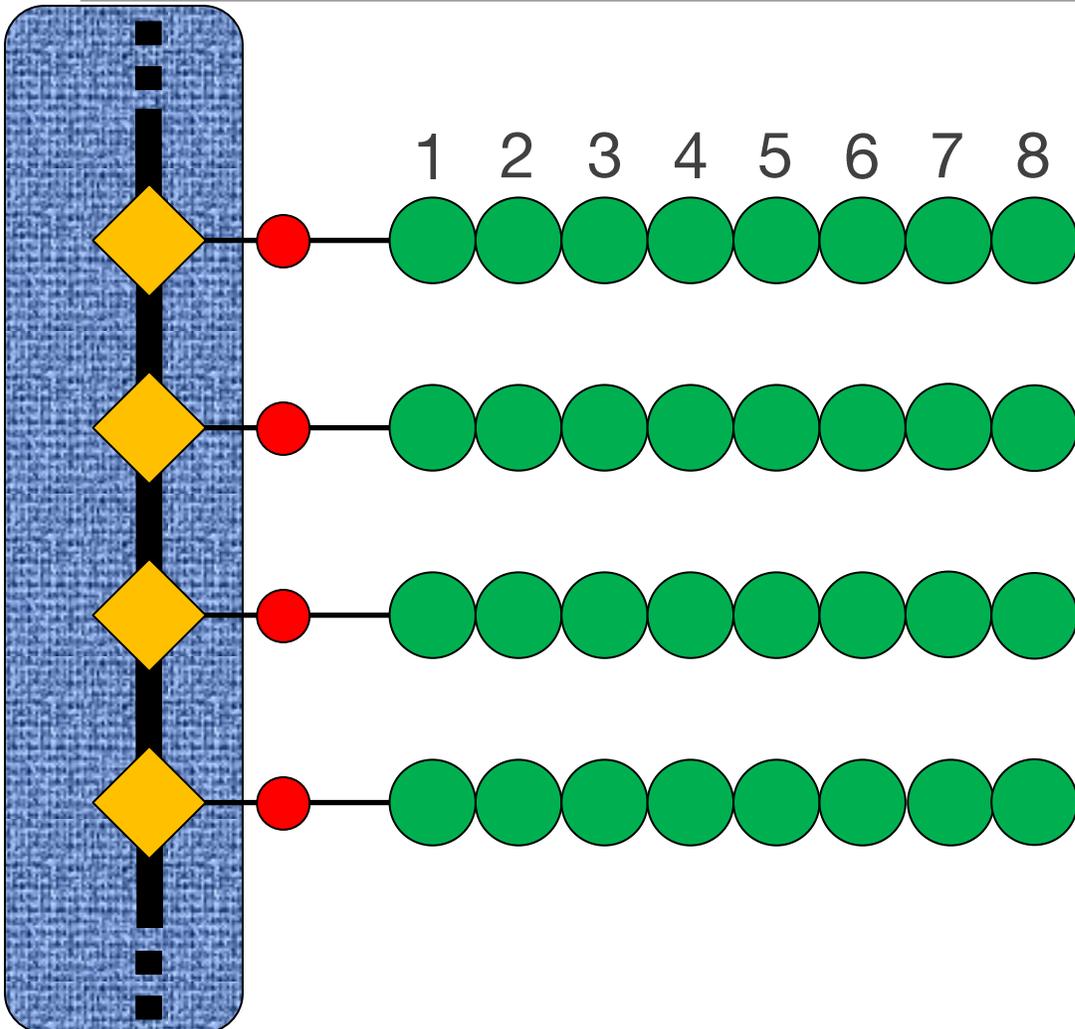
In the EU, the legal limit values for individual PFAS  
range from 0.025 to 1 mg/kg!

$$TF = TOF (\text{PFAS} + \text{non-PFAS}) + TIF$$

# Targeted analysis of individual PFAS e.g. EN 17681-1:2025



# Fluorocarbon finishes: sidechain-fluorinated polymers (SFPs)

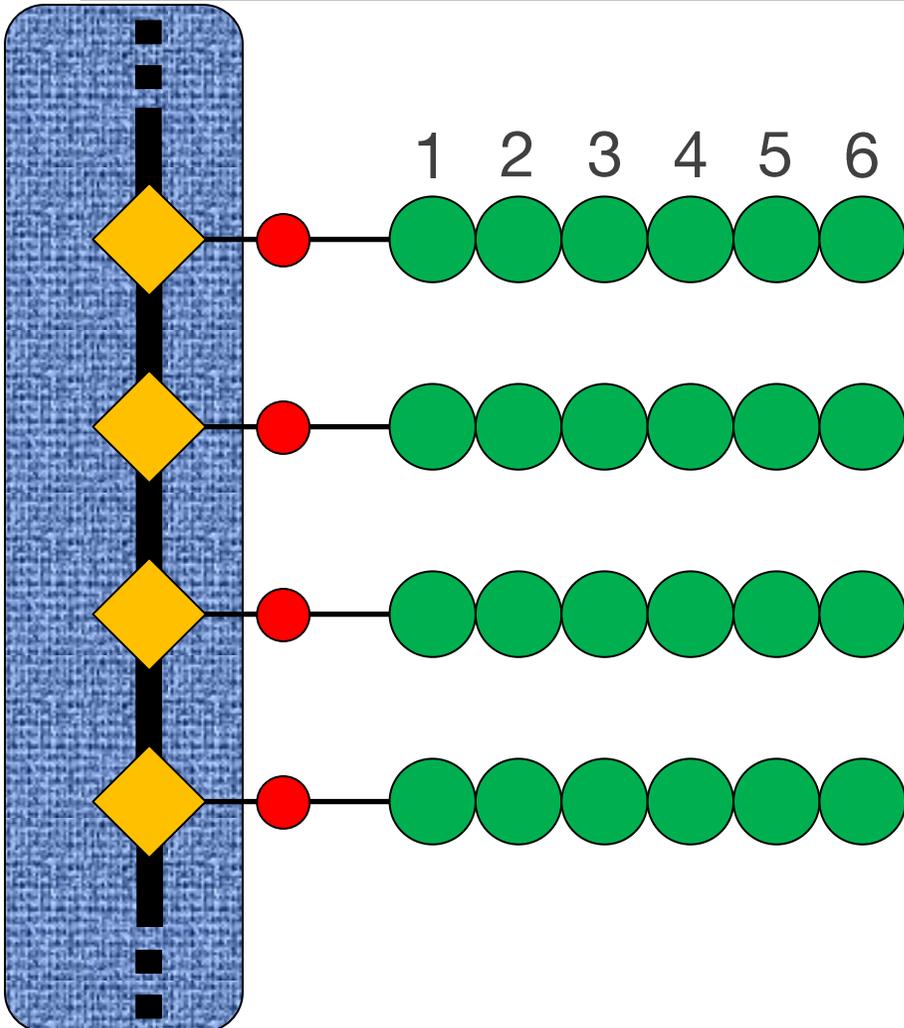


## C8-chemistry

The impurity and degradation product perfluorooctanoic acid (PFOA) is persistent, bioaccumulating, toxic, toxic for reproduction and is suspected of causing cancer.

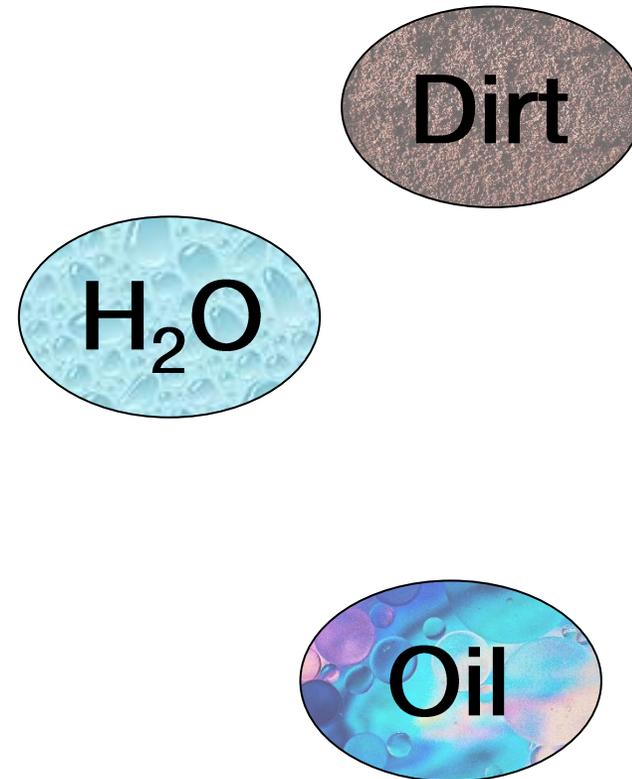
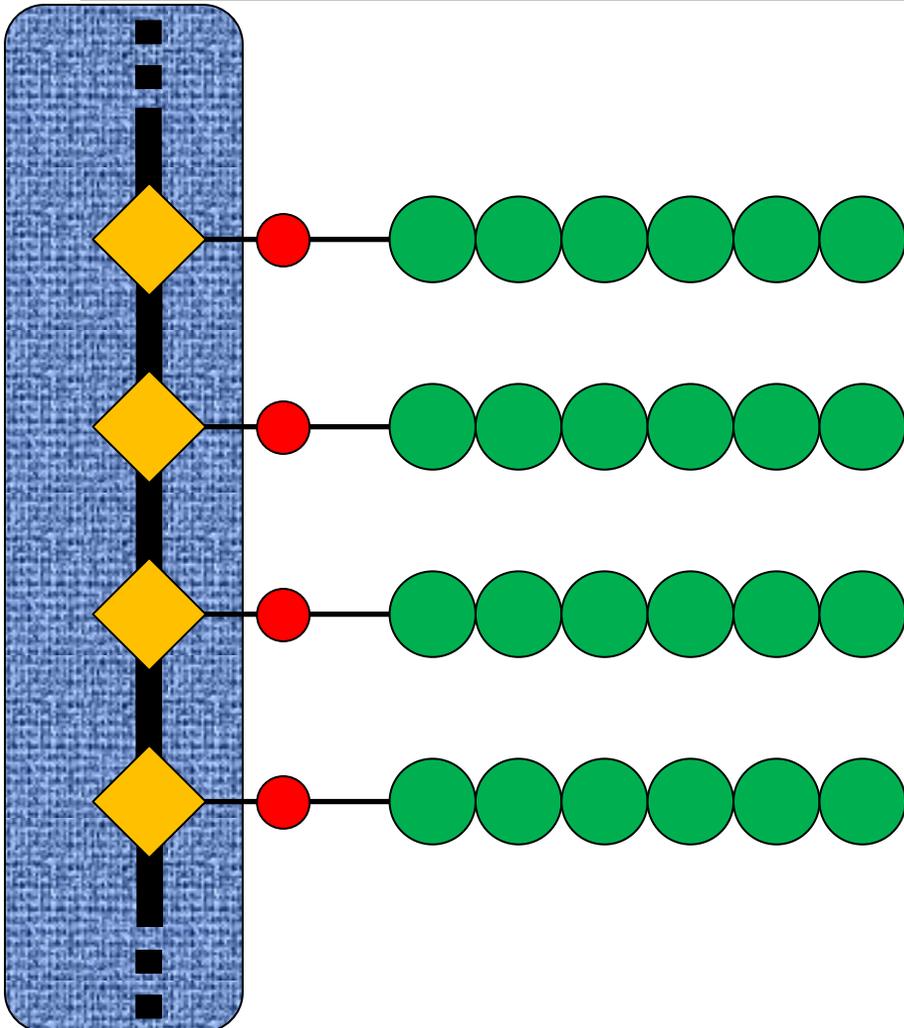
→ Prohibition of C8-chemistry (since 2020)

# Fluorocarbon finishes: sidechain-fluorinated polymers (SFPs)

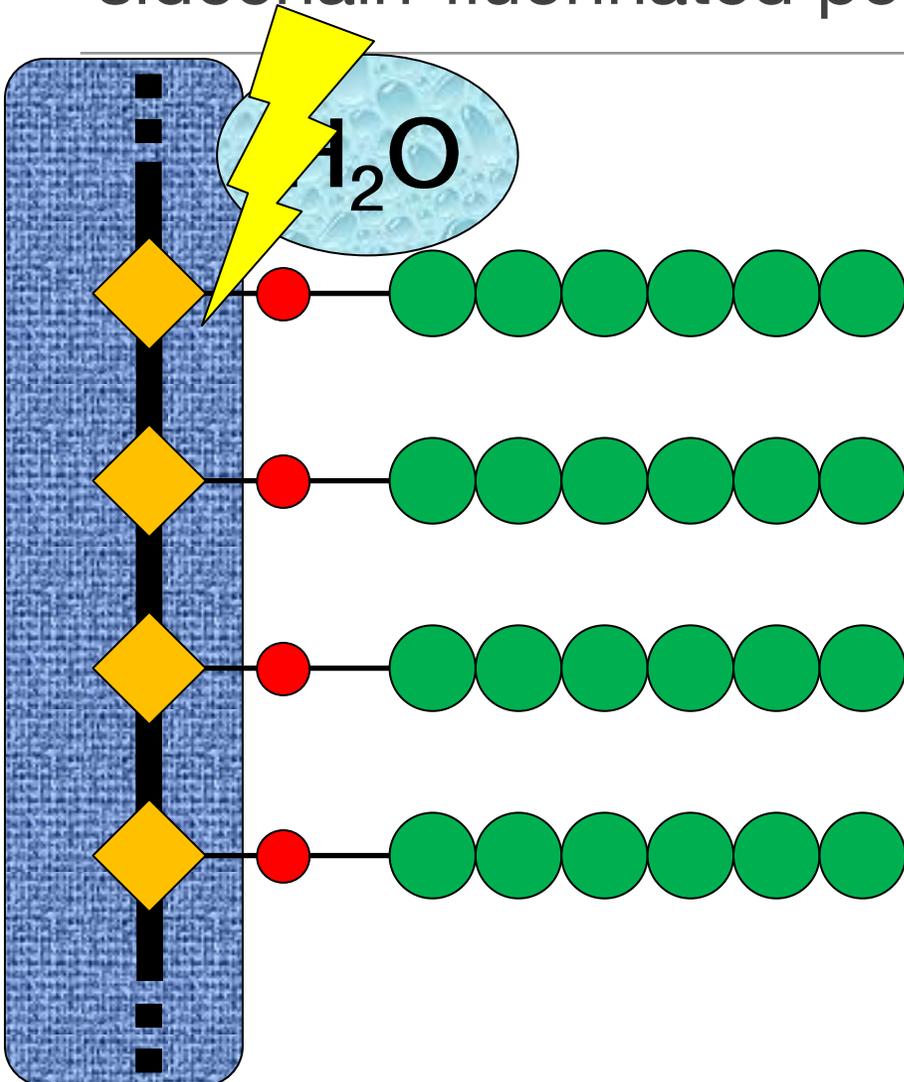


C6-chemistry

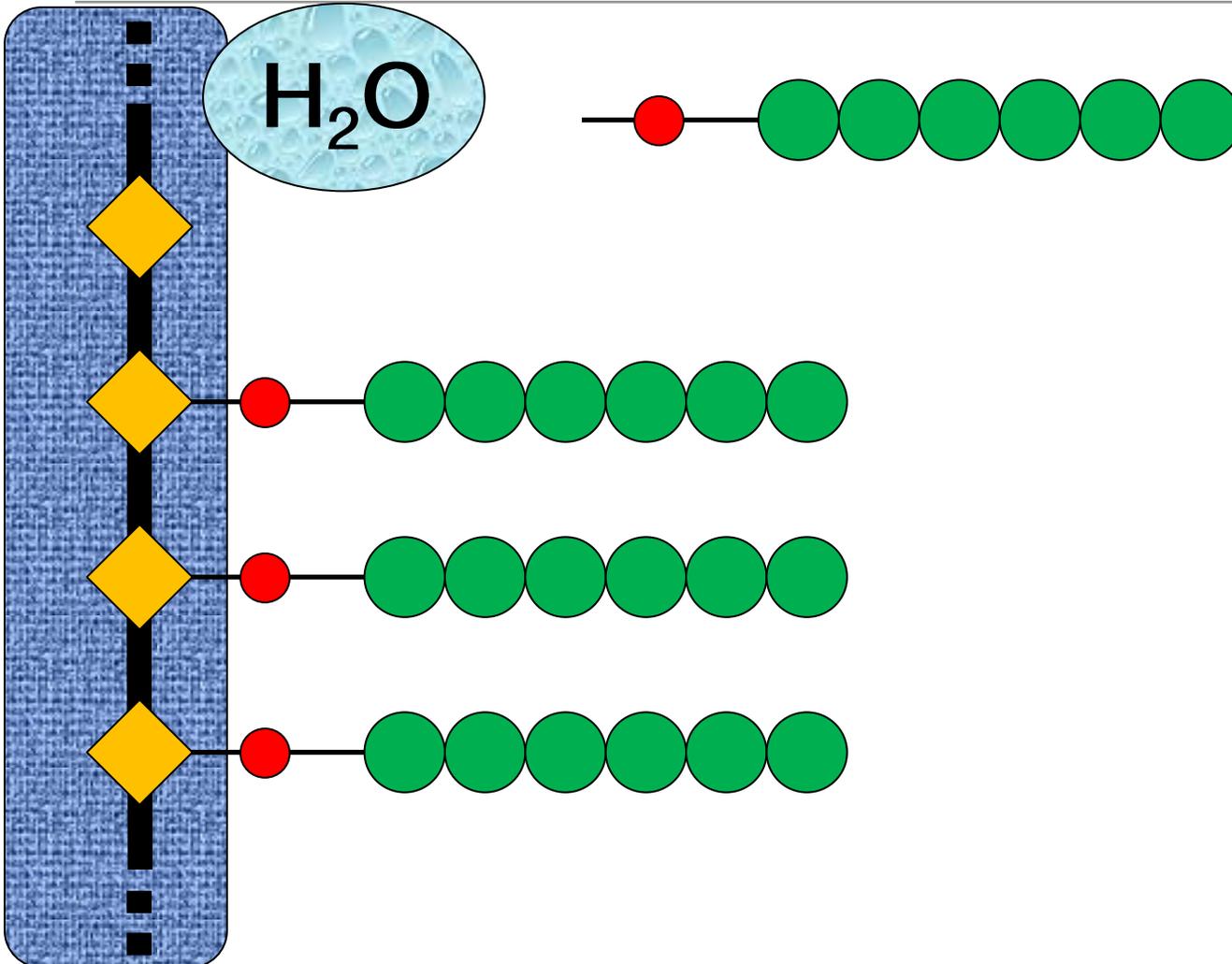
# Fluorocarbon finishes: sidechain-fluorinated polymers (SFPs)



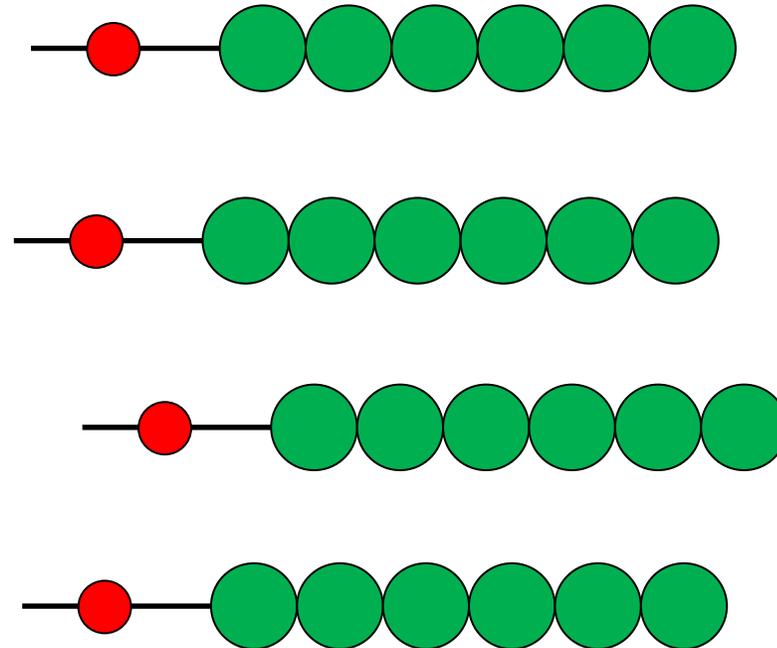
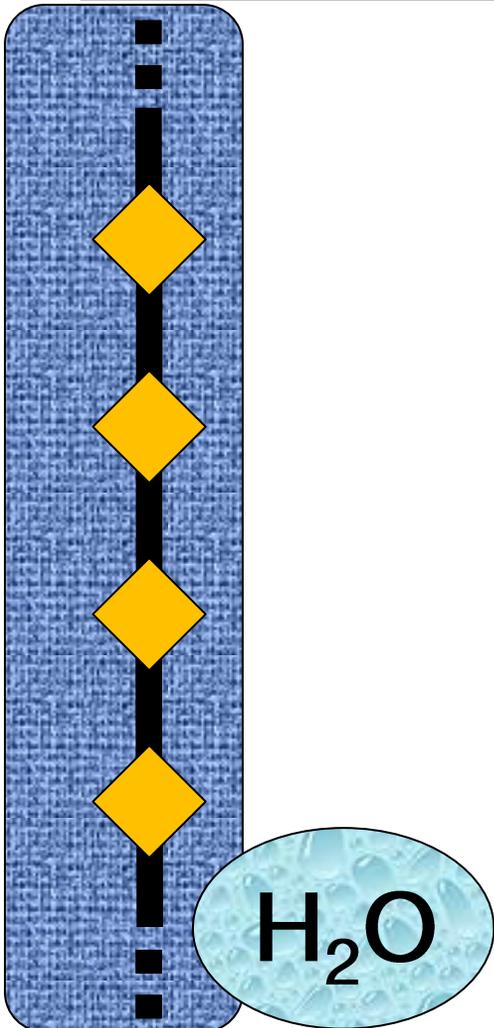
# Fluorocarbon finishes: sidechain-fluorinated polymers (SFPs)



# Fluorocarbon finishes: sidechain-fluorinated polymers (SFPs)

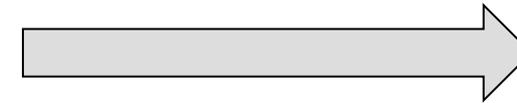


# Fluorocarbon finishes: sidechain-fluorinated polymers (SFPs)



6:2 FTOH

Further complex  
degradation  
in the environment



PFHxA

PFHxA is very persistent and suspected to be bioaccumulating  
→ **Prohibition of the C6-chemistry**  
(from October 2026 with derogations)

PFHxA and its salts: 0.025 mg/kg  
PFHxA-related substances: 1 mg/kg

# PFOA-related substances / compounds

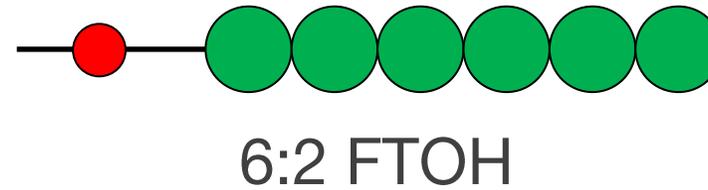
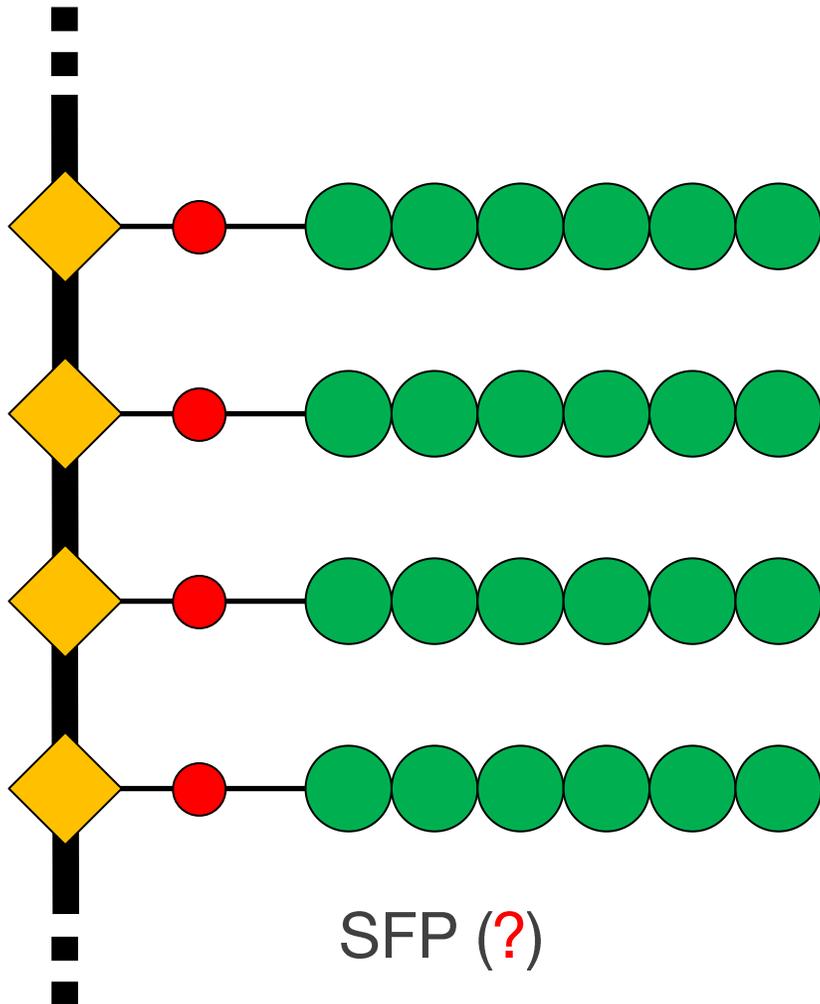
“PFOA-related compounds which, for the purposes of the Convention, are any substances that degrade to PFOA, including any substances (including salts and polymers) having a linear or branched perfluoroheptyl group with the moiety  $(C_7F_{15})C$  as one of the structural elements.”

(Annex I, POP Regulation)

“For the purposes of this entry, PFHxA-related substances are substances that, based on their molecular structure, are considered to have the potential to degrade or be transformed to PFHxA.”

(Paragraph 9, Column 2, Entry 79, Annex XVII, REACH)

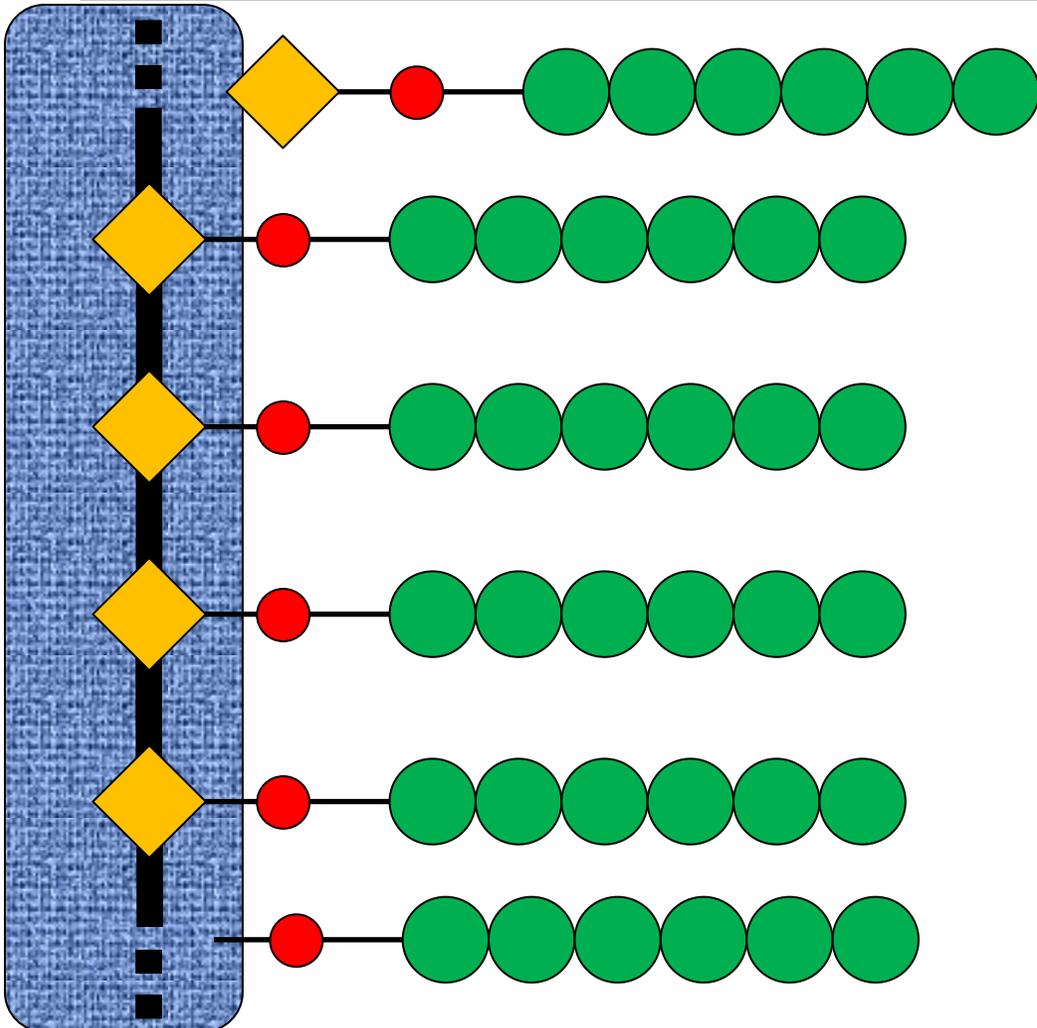
# Fluorocarbon finishes: PFHxA related substances



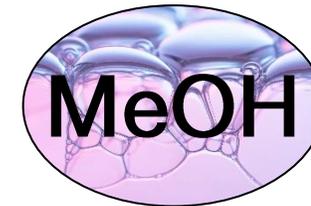
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# Old test method according to EN 17681-1:2022



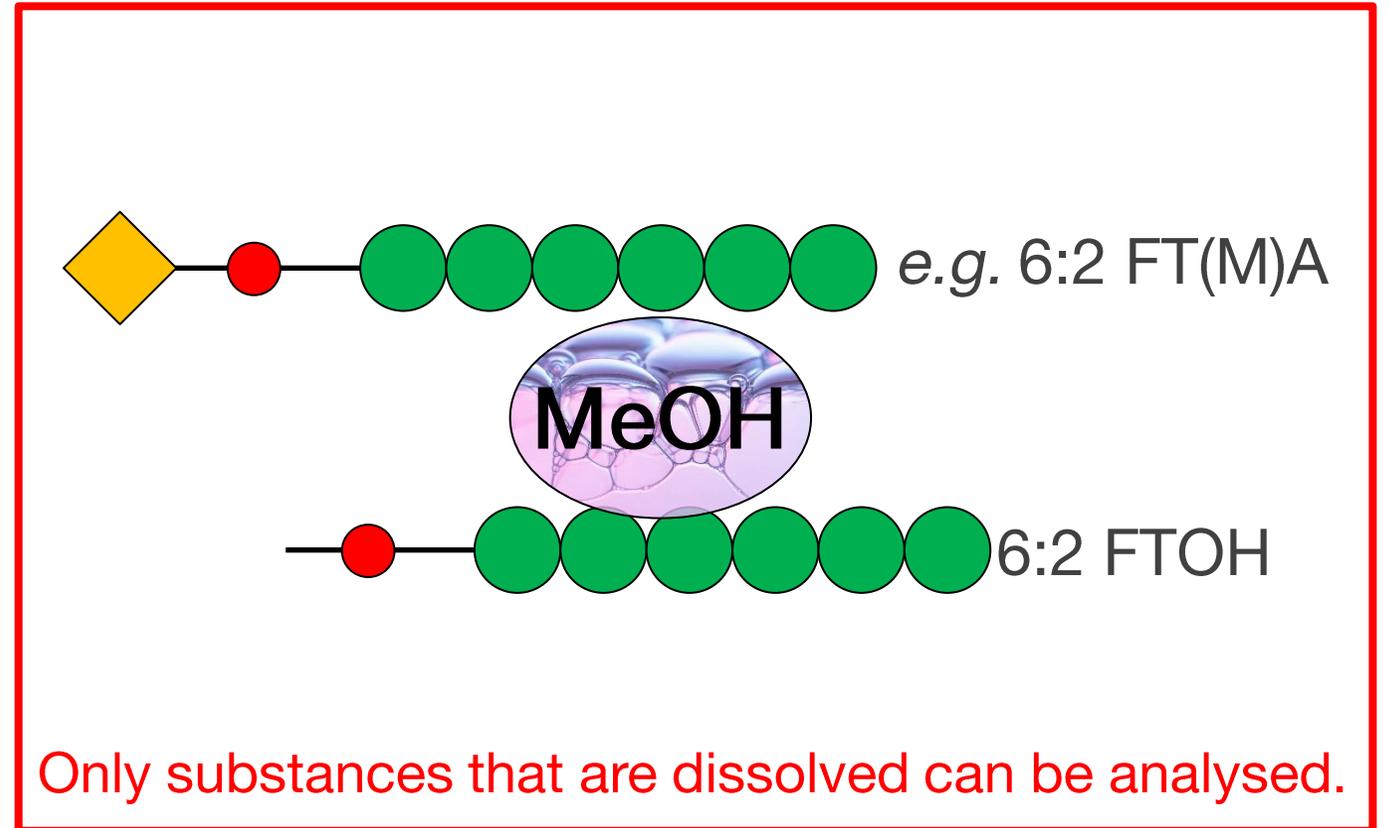
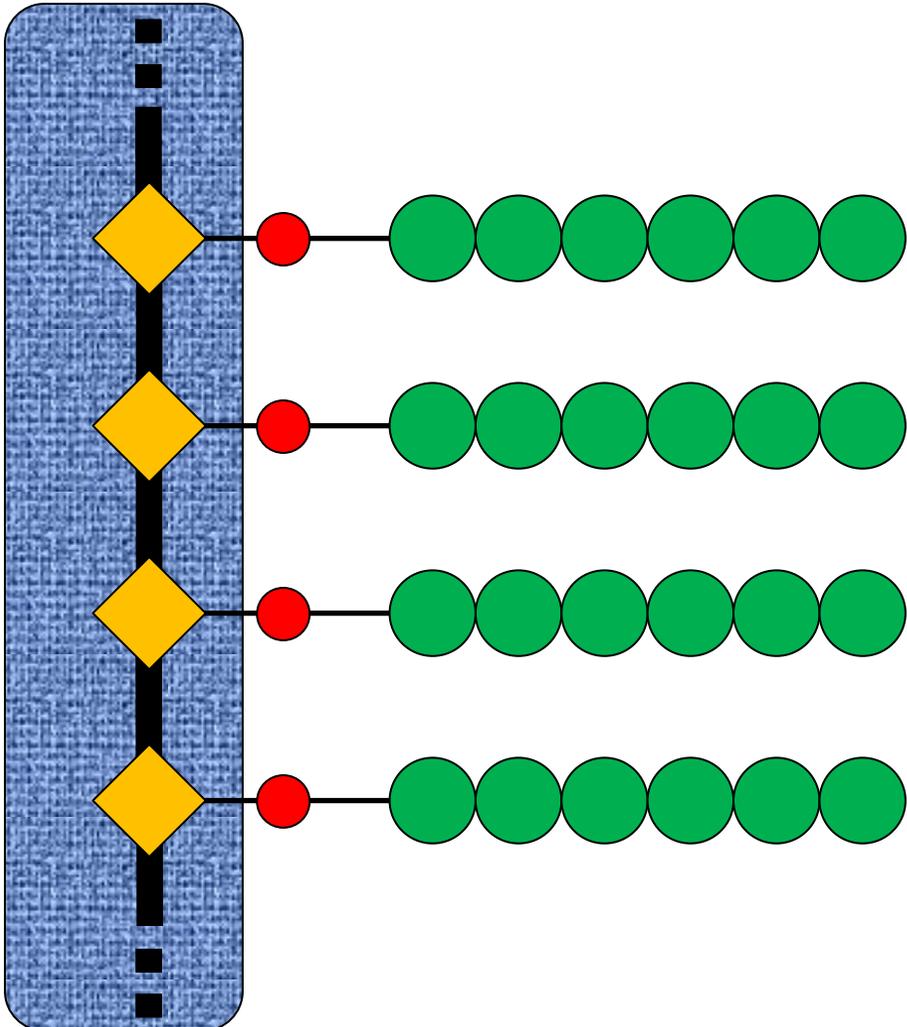
e.g. 6:2 FT(M)A



6:2 FTOH

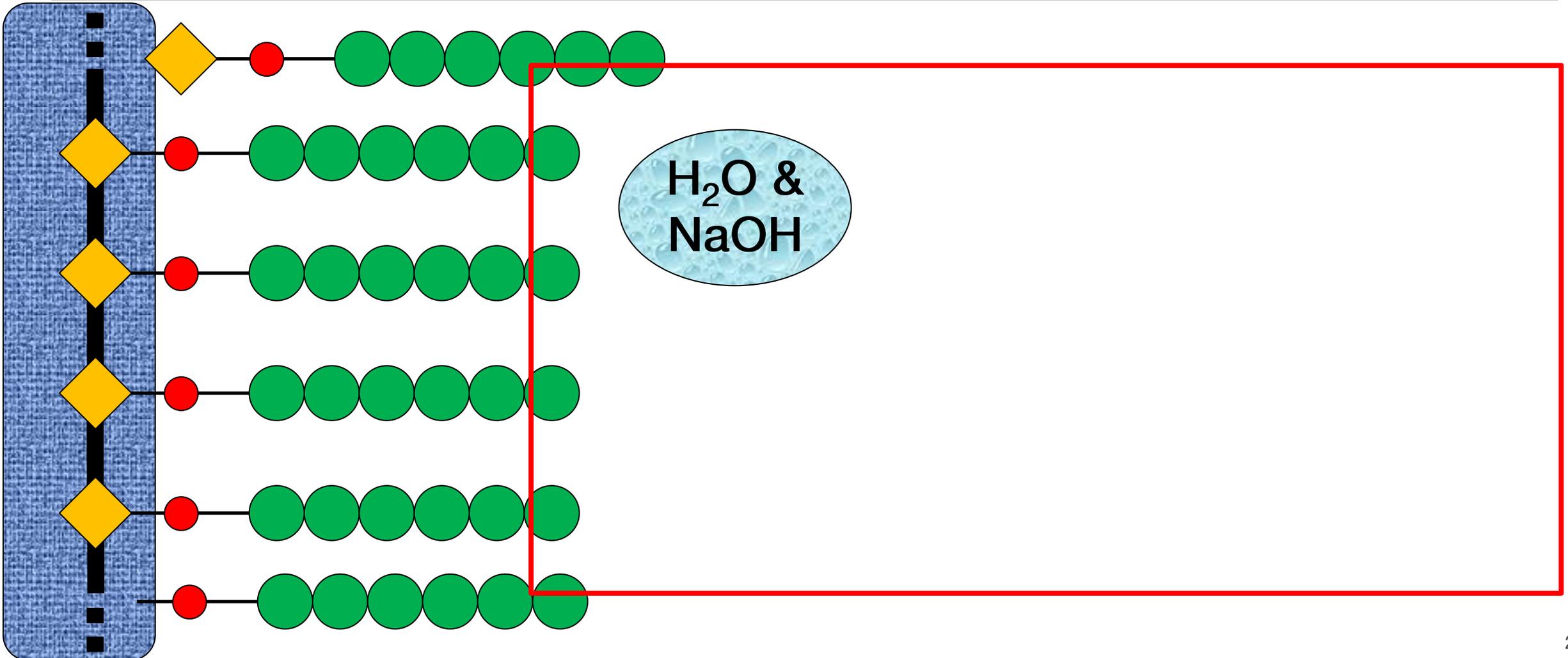
Only substances that are dissolved can be analysed.

# Old test method according to EN 17681-1:2022

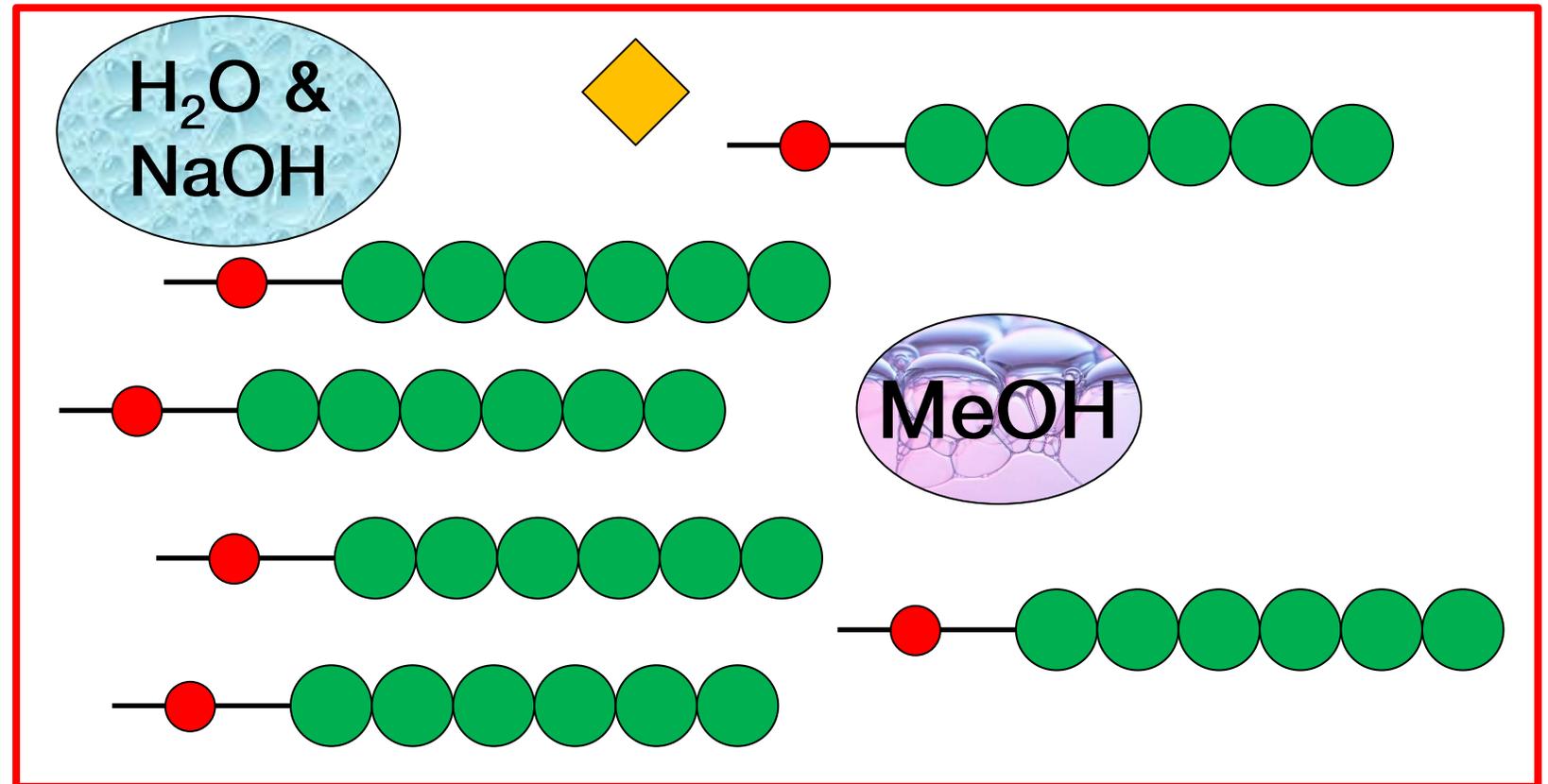
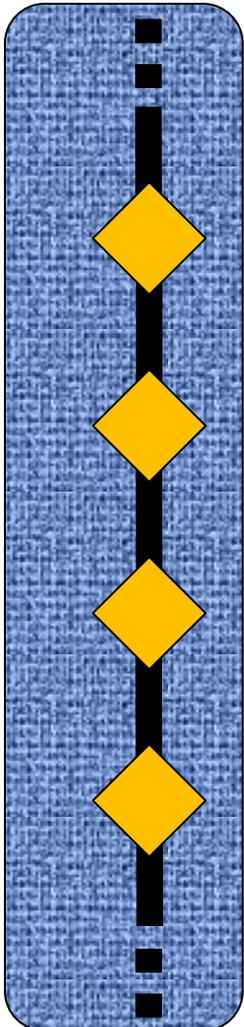


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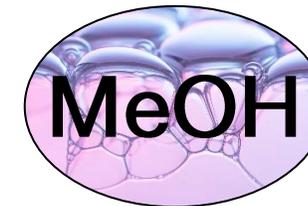
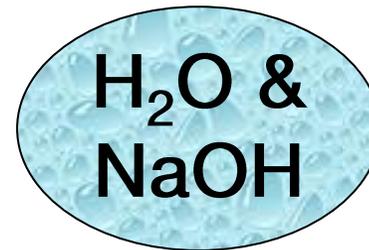
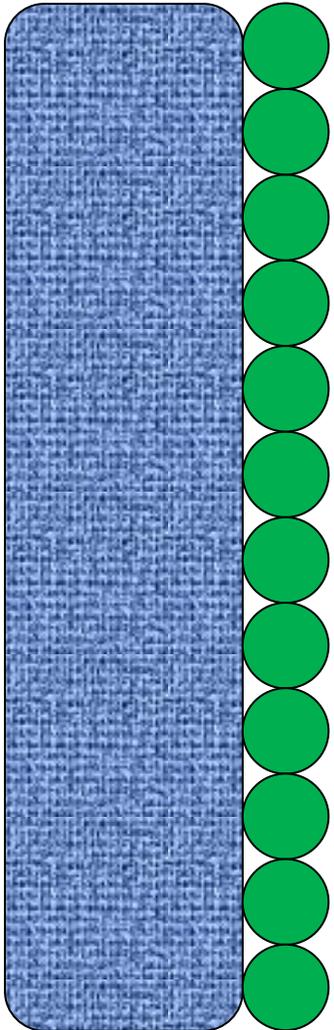
# New test method according to EN 17681-1:2025



# New test method according to EN 17681-1:2025



# EN 17681-1:2025 PTFE-membrane



PTFE does not degrade under alkaline conditions, nor does it dissolve → PTFE is not detectable using EN 17681-1:2025.

# Analytical drawbacks of EN 17681-1:2025

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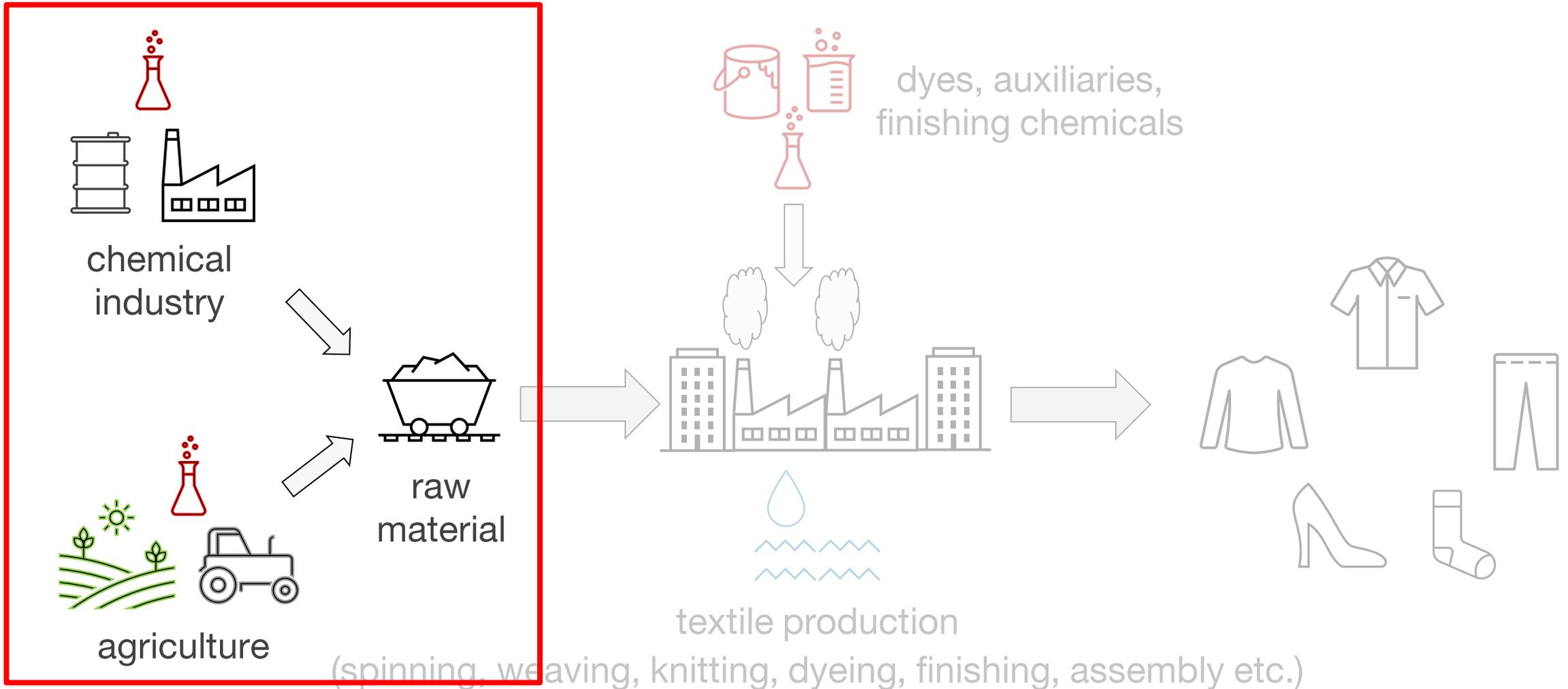
- n:2 FTOH findings consist of free n:2 FTOH and alkaline-degradable precursors (e.g. n:2 FT(M)A or certain SFPs)
  - No identification of precursor substances possible
  - Uncertainty whether all alkaline-degradable precursors are PFCA-related substances
- PFCA findings consist of free acids, their salts and certain alkaline-degradable precursors
  - No identification of precursor substances possible
  - Uncertainty whether PFCA findings include PFCA-related substances such as esters of the acid (e.g. Me-PFOA).

# Overview of relevant restrictions

Legislation	Substances	Limits	Test method		
			EN 17681-1		prEN ISO 20999:2025
			:2022	:2025	
Entry 79, Annex XVII, REACH	PFHxA and its salts	25 ppb (sum)		✓	
	PFHxA-related substances	1000 ppb (sum)		(✓)	
Entry 68, Annex XVII, REACH	C9–C14 PFCAs and their salts	25 ppb (sum)		✓	
	C9–C14 PFCA-related substances	260 ppb (sum)		(✓)	
Annex I, POP	PFOA and its salts	25 ppb (sum)		✓	
	PFOA-related compounds (including polymers)	1000 ppb (sum)		✓	
France: Art. L524-1 in conjunction with Art. D525-4 of the <i>Code de l'environnement</i>	PFAS, excluding polymers	25 ppb (each)	✓	?	
	PFAS, where appropriate with prior impairment of precursors, excluding polymers	250 ppb (sum)	(✓)	?	
	PFAS, including polymers	50 ppm (sum)			✓
Denmark: BEK nr 464	Total fluorine content (TF)	50 ppm			✓

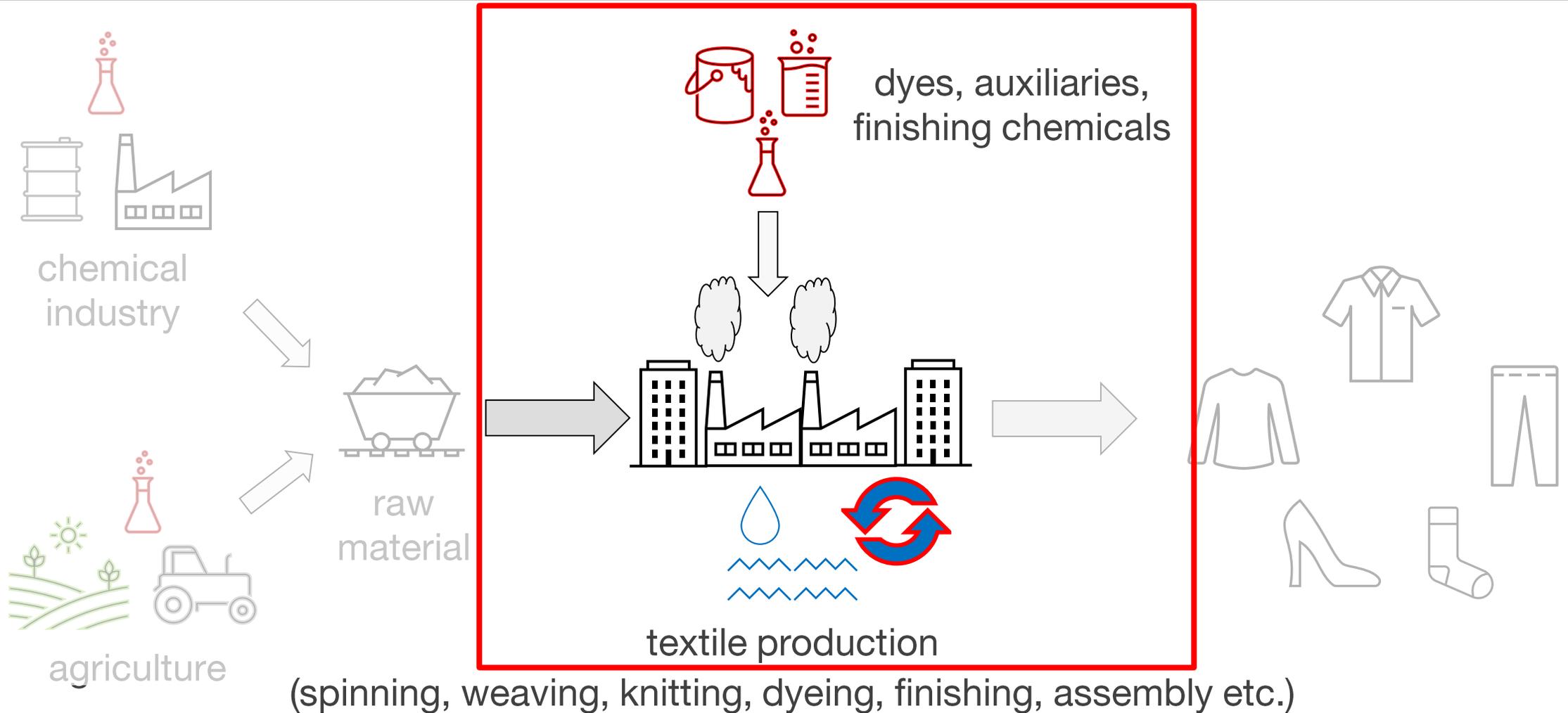
# Textile production

## Where do chemicals enter?



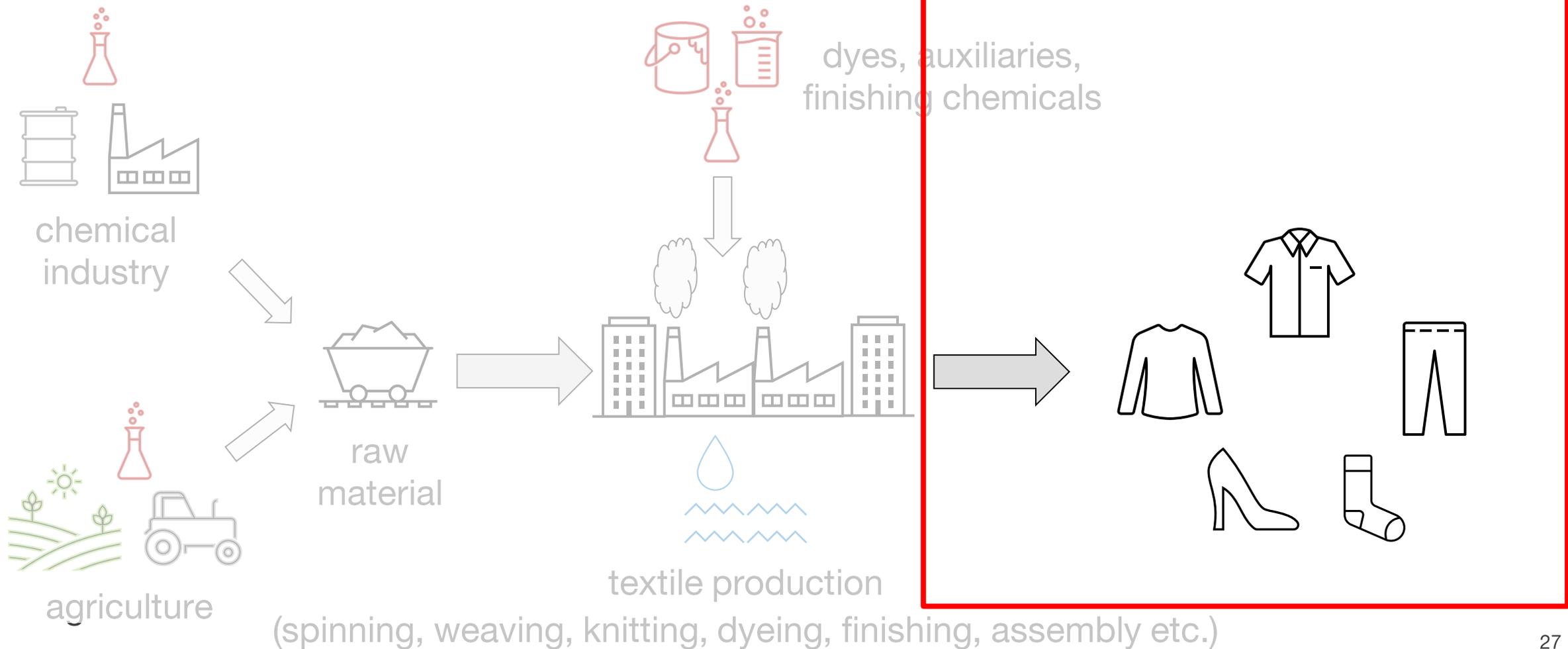
# Textile production

## Where do chemicals enter?

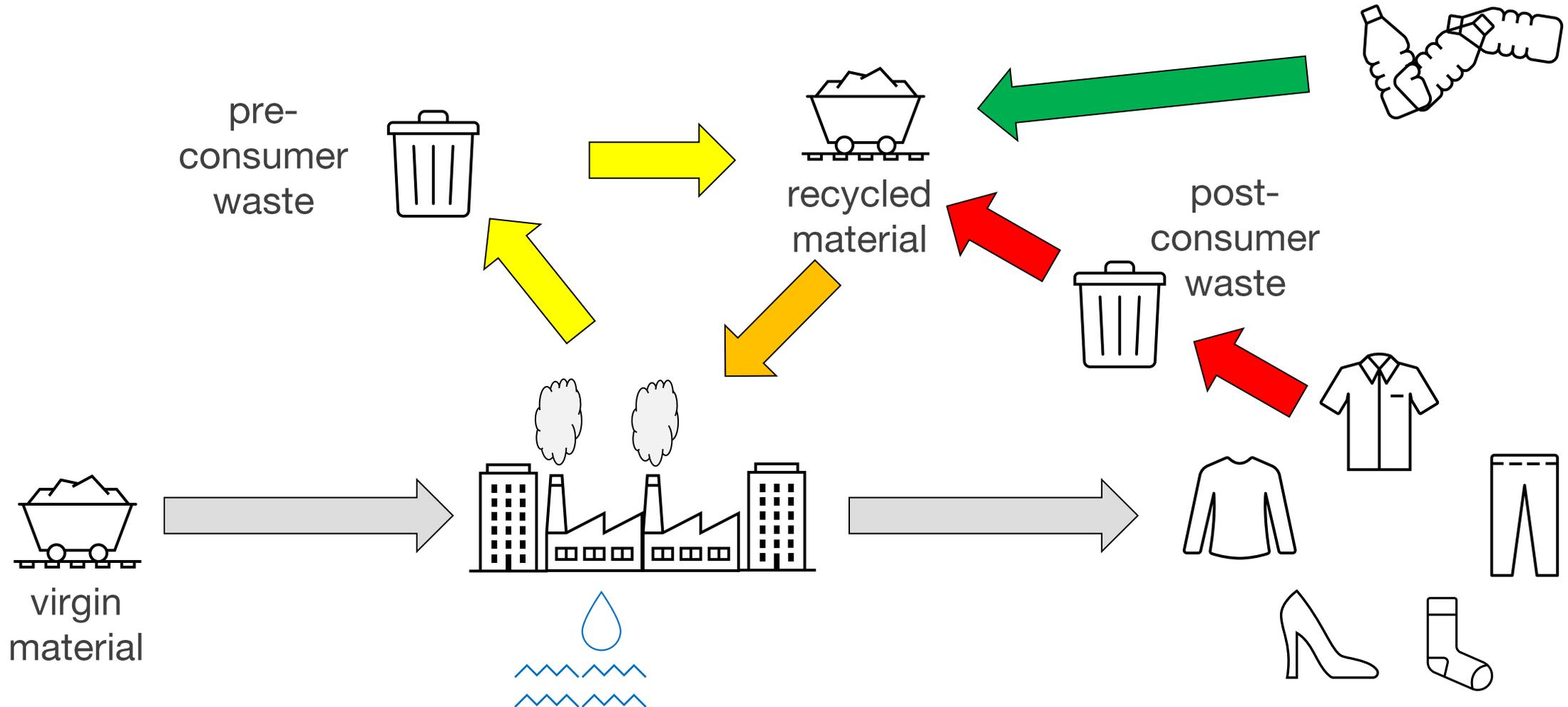


# Textile production

## Where do chemicals enter?



# Recycling and its chemical drawbacks



# Potential sources of contamination

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- Cross-contamination from machines, equipment and tools during production
  - The supplier also uses PFAS at its facilities for other customers/products, and the machinery may still contain residues of such chemicals, which can be transferred to the goods
  - Components or operating materials of machinery, equipment or tools may intentionally contain or consist of PFAS, *e.g.* lubricants, oils, rollers, coatings and seals
  - Contaminated recycled processing water
- Contaminated recycled materials (in particular from textile-to-textile recycling)
- Contaminations of long-chain substances in C6-chemistry (if fluorocarbons are still used for finishing)
- PFAS-containing packaging (less likely)
- According to literature, PFAS are also used in other applications, as anti-foaming, wetting and release agents in dyeing processes (due to higher cost of PFAS-containing auxiliaries to alternatives, this is also considered unlikely)

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